

Claims

1. Pivotal binding system for mounting between a sports device and a tread surface for a user's foot, in which the tread surface is pivotable about an axis extending almost parallel with the ankle joint of the foot and is displaceable, in at least one part region co-operating with the ball of the foot, to a position closer to the sports device, and can be joined to the sports device by at least one binding element, characterised in that the binding element (11) is flexible and is resiliently deformable in a vertical plane (8).
2. Pivotal binding system as claimed in claim 1, characterised in that the binding element (11) is strip-shaped but resistant to expansion and shrinkage and, at end regions (17, 18) spaced apart from one another in the longitudinal direction - double arrow (9) - of the tread surface (5) for the foot, is immovably secured respectively to a shoe sole (6) forming the tread surface (5) and the sports device (2).
3. Pivotal binding system as claimed in claim 1, characterised in that in the end region (18) co-operating with the sports device (2), the binding element (11) is rigidly joined thereto and in the end region (17) co-operating with the tread surface (5) is joined to the latter by a hinge mechanism (45).
4. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the deformability of the binding element (11) in the vertical plane (8) is restricted and under normal conditions of use may not be deformed in a vertical direction, starting from the sports device (2), beyond an initial shape or a shape in its rest state or beyond a substantially longitudinally extended configuration.
5. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that a lateral guide device (30) is provided in order to prevent displacements in a direction perpendicular to the vertical plane (8) and twisting movements about an axis extending in a vertical direction between the tread surface (5) and the sports device (2).

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6. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the lateral guide device (30) is provided as a groove-shaped recess (29) in the shoe sole (6) extending in a longitudinal direction - double arrow (9) - of the tread surface (5) and a projection (28) on the sports device (2) co-operating with this recess (29).

7. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the binding element (11) is a leaf spring (12) made from an elastically resilient, metallic material.

8. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the binding element (11) is a strip which is resistant to expansion and substantially to shrinkage but which is resiliently deformable and flexible in a direction perpendicular to the two broad sides (13, 14) thereof.

9. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that between the shoe sole (6) and the sports device (2) in the region co-operating with the balls of the feet, a rolling body (22) is provided forming a curved rolling surface (25, 26, 27) and the rolling surface (25, 26, 27) is provided (6) on the rolling body (22) as a support for the shoe sole (6), extending in a substantially linear direction perpendicular to the vertical plane (8).

10. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the rolling body (22) supports the tread surface (5) for the foot or shoe sole (6) at a vertical distance (24) above a top face (15) of the sports device (2).

11. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the rolling surface (25, 26, 27) extends on the rolling body (22), starting from a region of the tread surface (5) lying closer to the heel, in a direction towards a toe region of the tread surface (5) and in a direction towards a running surface (10) or in a direction towards the top face (15) of the sports device (2) or moves closer to the latter.

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12. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the rolling body (22) forms at least two rolling surfaces (25, 26, 27) spaced apart from one another in height, the top rolling surface (27) forming a predefined rolling path for the binding element (11) when the tread surface (5) is pivoted upwards from the sports device (2) and the rolling surfaces (25, 26) on a lower level arranged on either side of the top rolling surface (27) are designed for rolling the toe-region of the shoe sole (6) in a direction towards the sports device (2) when the shoe sole (6) is pivoted upwards from the sports device (2).

13. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the centre rolling surface (27) on the rolling body (22) forms a slide track for the leaf-spring binding element (11) and side faces (31, 32) of the projection (28) on the rolling body (22) are designed to abut largely without any clearance with side walls (33, 34) of the groove-shaped recess (29) in the shoe sole (6) to form the lateral guide device (30).

14. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the rolling surfaces (25, 26) on either side of the centre rolling surface (27) form a slide track for the rolling movement of the shoe sole (6).

15. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that a deformation resistance perpendicular to the broad sides (13, 14) of the binding element (11) is dimensioned so as to be greater than a gravitational force acting on the binding element (11) through the sports device (2).

16. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the tread surface (5) or the shoe sole (6) co-operates with an elastically resilient spring means (39, 41) which forces the tread surface (5) into a position extending almost parallel with the sports device (2).

17. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the spring means (39) is a damping body (40) which is elastically flexible and

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resilient when pressure is applied, in particular made from an elastomeric synthetic material, in the toe region of the tread surface (5) between it and the sports device (2).

18. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the spring means (41) is a tension band (42) which is elastically flexible and resilient when subjected to tensile stress, in particular made from an elastomer synthetic material, and is arranged before the joining point, relative to the longitudinal direction - double arrow (9) - of the tread surface (5), between the binding element (11) and the shoe sole (6), being joined to the shoe sole (6) on the one hand and to the sports device (2) on the other.

19. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that an elastically resilient spring member co-operates with the hinge mechanism (45) pivotably joining the shoe sole (6) to the binding element (11), in particular in the form of a torsion spring, which applies a mechanical resistance against the upward pivoting movement of the tread surface (5) relative to the sports device (2), which can be overcome by the user's foot.

20. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the return movement of the binding element (11) in a vertical direction starting from the sports device (2) is restricted by an anti-lift mechanism (52) comprising a tension-resistant securing element (53) joined to the sports device (2) and the shoe sole (6).

21. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the binding element (11) is a link strip having links which are able to pivot in a vertical direction starting from the sports device (2) and restricted by stops.

22. Pivotal binding system as claimed in one or more of the preceding claims, characterised in that the link strip can be displaced, starting from a longitudinally extended position, in a direction towards the sports device (2) to assume a curved position.

23. Pivotal binding system for mounting between a sports device and a tread surface for

a user's foot, in which the tread surface is pivotable about an axis extending almost parallel with the ankle joint of the foot and is displaceable, in at least one part region co-operating with the ball of the foot, to a position closer to the sports device, and can be joined to the sports device by at least one binding element, in particular as claimed in one or more of claims 1 to 22, characterised in that the tread surface (5) for the foot rests on a rolling body (22) having an arcuately curved rolling path and a lever (67) is provided as the only binding element (11), which is joined to the tread surface (5) by means of a hinge mechanism (45) in a first end region (17) and, spaced at a distance therefrom, to the rolling body (22) by means of another hinge mechanism (68) in a second end region (18), and the tread surface (5) is supported in a gliding action on the curved rolling surface (27) of the rolling body (22) when pivoted by the hinge mechanisms (45, 68) about pivot axes (46, 71) extending substantially perpendicular to a vertical plane (8).

24. Pivotable binding system as claimed in claim 23, characterised in that, when the binding system (1) assumes the initial or rest position, the pivot axis (46) of the hinge mechanism (45) between the tread surface (5) and the lever (67), which is variable in height on a circular track (75) about the pivot axis (71), is on a higher level in the vertical plane (8) than the stationary pivot axis (71) between the lever (67) and the rolling body (22).

25. Pivotable binding system as claimed in claim 23 or 24, characterised in that at least one of the pivot axes (46, 71) co-operates with an energy storage device (76, 77) which acts against the upward pivoting movement of the tread surface (5) relative to the sports device (2), in particular in the form of coil springs (78, 79).

26. Pivotable binding system as claimed in one or more of claims 23 to 25, characterised in that a predominant part region of the lever (67) is disposed in a recess (72) in the rolling body (22) and the recess (72) forms at least one stop element (73, 74) to restrict the pivoting action of the lever (67) about the stationary pivot axis (71).

27. Pivotable binding system as claimed in one or more of claims 23 to 26, characterised in that the lever (67) extends substantially parallel with the tread surface (5) or a line joining

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the pivot axes (46, 71) subtends an acute angle with a horizontally extending plane.

28. Shoe for binding to a sports device, in particular a runner or roller body, characterised in that it is designed to be releasably joined to the pivotable binding system (1) as claimed in one or more of the preceding claims.

29. Sports device, in particular for runner or roller bodies to providing gliding or rolling support for a user's foot, characterised in that it is designed to receive or retain the pivotable binding system (1) as claimed in one or more of claims 1 to 27.

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